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Improving Communication in a Virtual Team: A Quality Improvement Project

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Abstract

Problem: Data analysis based on two surveys revealed team communication, interdependence, technology interfaces, and integration as the quality gaps in the Virtual Surveillance Team. When compared with traditional in-person teams, a virtual working team faces different types of communication challenges.

Context: The virtual surveillance team in the regional quality department at Oakland monitors both Advance Alert Monitor (AAM), a statistical model developed by the Kaiser Permanente (KP) Division of Research (DOR) that is used to predict an individual's likelihood of deterioration, and eHospital care gaps for Kaiser Foundation Hospitals in Northern California (KFH, NCAL). The latest evaluation from DOR of the AAM intervention in the pilot site from August 2016-February 2017 showed mean 35.5 hour reduction in hospital length of stay (LOS), and mean 19.1 hour reduction in Intensive Care Unit (ICU) LOS (Kaiser Permanente, 2017). As a result of the AAM implementation, the KP NCAL region planned to implement AAM intervention in all 21 facilities of KFH. To achieve this goal, the virtual surveillance team which includes the Clinical Nurse Leader (CNL) student has expanded rapidly. Communication failures have been frequently attributed to harmful events in healthcare for nearly two decades (Clarke, 2016). For this reason, better communication strategies, knowledge sharing among the team members, and collaborative technologies are critical for the CNL student's team, where patient safety is the primary goal.

Interventions: The quality improvement project aims at two interventions with the purpose of streamlining the workflow, and improving communication among the team. One intervention is to create a SharePoint team communication platform. A second is to develop an online training module of the SharePoint site for the team.

Measures: The outcome measures are to improve the percentage of interdependence responses, and the percentage of integration of technology used to support the work of the virtual team. The outcome measures are analyzed through pre, intermediate, and post implementation surveys.

Results: Trust and collaboration among team members increased from 58% to 72%. Integration of information and technology used to support the work of the team increased from 47% to 60%. With the implementation of SharePoint communication platform an increase in staff productivity is expected, due to decrease in time spent at the start of the shift to 15 mins per team member. The cost avoidance accrued through increase in staff productivity is estimated to be $21,040. The long term cost savings attributable to this project through enhanced communication and with AAM implementation is an estimated 4.5 hour mean reduction in hospital length of stay and a 0.9 mean hour reduction in ICU length of stay. This would generate an annual cost savings of $14,160 per facility in 2018 with an estimated annual savings of $142,000 for the healthcare organization. The team effectiveness, and the ease of use of technology is expected to improve once the SharePoint site has been implemented.

Conclusions: The implications for practice are pending based on feedback from team members after using the site. Enhanced team communication with this project implementation is predicted to improve quality outcomes and increase cost savings.

Improving Communication in a Virtual Team: A Quality Improvement Project

Introduction

Virtual teams are a common organizational structure in today's globalized business environment (MacLachlan, 2017, para. 1). "A virtual team, also known as virtual workgroup, is a group of people who participate in common projects by making collaborative efforts, and for the purpose of achieving shared goals and objectives" (McConnell, 2010, "Virtual Teams – Definition," para. 2). According to an article published in Harvard Business Review by Ferrazzi (2014), a 2009 study of 80 global software teams indicates that, "well-managed dispersed teams can actually outperform those that share office space" ("Getting Virtual Teams Right," para. 4). Ferrazzi found that using virtual teams can improve employee productivity with some organizational gains of up to 43%, but that it is hard to get the virtual teams right. Hence, credible virtual team management is key to building a successful virtual team, fostering teamwork, and increasing productivity.

The Clinical Nurse Leader (CNL) student's virtual surveillance team in the regional quality department at Oakland, is comprised of both in-person and virtual team members. The team is comprised of Quality Nurse Consultants (QNC) with a Master's degree or those who are in the process of completing their Master's program. All the team members have a minimum of three years of experience either in clinical leadership roles, or quality operations in acute care settings.

The team is currently working on a custom built predictive model called Advance Alert Monitor (AAM). AAM proactively identifies patients with a high risk of mortality, triggers the clinician to triage patients appropriately, utilizes ICU resources, reduces hospital LOS, improves patient satisfaction, and includes integration of Life Care Planning or palliative care, if

appropriate. AAM is a statistical model developed by the Kaiser Permanente (KP) Division of Research used in early detection of impending deterioration of patients admitted to the adult ward and Transitional Care Unit (TCU), aiming to give 12 hours lead time for the team to act.

A web service scans Kaiser Permanente Health Connect (KPHC) which is the electronic medical record of the Kaiser Foundation Hospital patients, and other KP information sources in real time (Kaiser Permanente, 2017). Data is extracted and an algorithm populates equations and generates a probability of deterioration. This probability score is sent back to an external website, and viewed by the QNC. The QNC then communicates by telephone with the local rapid response team registered nurses (RRT RNs) in the hospitals who assess the patient at their bedside. The scores are generated every hour, and scores above 8% trigger clinicians to take action.

This predictive model tested in a pilot site has shown statistically significant reductions in inpatient mortality, 30- day mortality, hospital length of stay (LOS), and Intensive Care Unit (ICU) LOS for patients thus enhancing patient safety, and improving outcomes (Kaiser Permanente, 2017). The main goal for the virtual surveillance team in 2018 is to implement AAM intervention in all 21 facilities of KFH, Northern California. To achieve this goal, the team has expanded rapidly from a legacy team of seven members to a total of 30 members within six months.

Eighty-four percent of the team members work from home in various shifts, widely dispersed geographically. When compared with traditional in-person teams, a virtual working team faces different types of communication challenges. Knowledge sharing between internal and external members in virtual teams requires different strategies to ensure optimal communication outcomes especially in this microsystem where patient safety is the primary goal.

For the virtual surveillance team to identify patients at risk for deterioration and work in a coordinated fashion, better communication strategies, knowledge sharing among the virtual team, information sharing with the RRT RNs, and collaborative technologies are critical.

Problem Description

To evaluate quality gaps in virtual team communication and team collaboration, a de novo survey was developed by the CNL student. The survey incorporated elements from the clinical microsystem assessment tool developed by the Institute for Healthcare Improvement (IHI), scholarly research, and tests published in peer-reviewed journals and approved for use by the authors. The clinical microsystem assessment tool has ten elements used to identify the key success characteristics of high- performing clinical microsystems; the student used five elements in the survey that were most relevant to the team.

A second survey included elements of teamwork, communication and technology. These two surveys formed the baseline data, provided insight into the team's interest, and identified elements of importance for the project focus. Data analysis revealed that team communication, interdependence, technology interfaces and integration were the quality gaps that provided the basis for focused team interventions.

Available Knowledge

PICOT

The PICOT question that guided the search for evidence in this project was: In virtual teams (P) are there specific strategies (I) to improve team communication and collaboration (C) compared to in person teams (O) to optimize team performance by July 2018 (T)?

A comprehensive electronic search was conducted in March 2018 in the Cochrane Database of Systematic Reviews, CINAHL Complete, and Pub Med databases using

combinations of the following search terms: Virtual teams, and communication. Limitations were set to include English only, peer reviewed, and publication dates no earlier than 2013. The search yielded 122 articles. Six articles met the search criteria and were selected for review.

Synthesis of Literature

The Johns Hopkins nursing evidence based practice (JHEBP) research evidence appraisal tool was used to appraise the evidence for this review. The synthesis of existing literature which includes quasi-experimental, observational, benchmarking studies, and online surveys indicated that process-oriented teams that are more open have incrementally better performance. In addition, team openness enhanced performance by facilitating information exchange to fill in structure (Workman, 2007). An open team is possessed of thin-permeable boundaries between in-group and out-groups, and the exchange of information is facilitated which supports the dynamic nature of virtual teams. Wright (2015) highlighted that successful virtual teamwork is dependent on the Collaborative Technology Skills Training (CTST) received by virtual team members. Wright also stressed that knowledge sharing, trust, performance, and satisfaction were increased as a result of having received training on the collaborative technologies used to interact online, thereby improving teamwork accomplishments.

Furthermore, Roy (2012) emphasized that individuals need to have relationship building skills, communication skills, and technological skills to engage in successful collaboration in virtual environments. Umoren et al. (2017) stated that communication failure can be reduced through interactive virtual simulations that prepares the learners to practice in teamwork and communication skills. In addition, Lepsinger & DeRosa (2011) showed that the five lessons learned to create successful virtual teams includes focus on people issues, trust, soft skills, creation of high-touch environment, and leadership.

Virtual simulation platform, and TeamSTEPPS communication tools "promotes retention and practical application of skills" (Umoren et al., 2017, p. 188). Majchrzak, MaIhotra, Stamps & Lipnack (2004) have illustrated that far-flung teams can be remarkably productive, even outperforming groups whose members work side by side. They also stated that far-flung teams have a wider variety of communication channels at their command and are free of many of the psychological and practical obstacles to full and effective participation. In addition, Majchrzak et al. (2004) emphasized that the three principles that guides the team's productivity are team composition, use of technology to coordinate their efforts, and how the team leaders induce a collection of strangers with little in common to function as a mutually supportive group. These studies ultimately support the proposition that team collaboration, communication, and technology skills are critical for virtual teams to succeed (See Appendix B).

Rationale

MacLachlan (2017) stated that many attributes such as different physical locations, languages, diverse cultures, and working styles can make virtual teams more complex. Therefore, the CNL student incorporates Everett Rogers' diffusion of innovation theory for the clinical improvement project to address the complexity of the team. Rogers (1983) has defined innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11), and diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). Rogers considered innovation, communication through certain channels, time, and social systems to be the main four elements influencing diffusion of new ideas through cultures. The creation of a SharePoint task force team, collaboration with the leadership and different task force teams,

WebEx meetings, and the recruitment of team members for end user testing are some elements of the theory which guided the project.

Rogers (1983) also emphasized that knowledge, persuasion, decision, implementation, and confirmation were the five main steps in which the innovation-decision process occurs. Correspondingly, he identified five categories of adopters—innovators, early adopters, early majority, late majority, and laggards. According to Rogers (1983), relative advantage, compatibility, degree of complexity, trialability, and observability were recognized as the intrinsic characteristics of innovations that influenced decisions to adopt or reject. Similarly, the design of the SharePoint site for the virtual surveillance team is an innovative process measure. Implementation of the SharePoint site, its utilization by the team, and the subsequent feedback from the team are factors that will guide adoption of the innovation.

Additionally, for any clinical improvement project, evidence based practice (EBP) models help to translate evidence into process. The EBP model includes cultivating a spirit of inquiry, formulating a clinical PICO question, searching and collecting evidence, critically appraising it, integrating it, evaluating, and finally disseminating the outcomes. Therefore, integration of the diffusion of innovation theory and the EBP model is an appropriate design for the clinical improvement project.

Specific Project Aim

The specific project aim is to improve communication in the virtual surveillance team from a baseline of 58% to 75% by July 2018.

Context

The microsystem assessment of the virtual surveillance team in the regional quality department at Oakland was performed using the Dartmouth Microsystem Assessment Tool (The

Dartmouth Institute, 2015). The purpose of the team is to mitigate risk, prevent harm, predict an individual's likelihood of deterioration, and promote best possible outcomes. The population includes all inpatient and newly admitted patients in all Kaiser facilities.

The virtual surveillance team is composed of one Executive Director, one Leader Strategic Implementation, three Clinical Practice Consultants, and 27 QNCs (four FTEs day shift, eight FTEs evening shift, four FTEs night shift, six part time, three perdiem, and one on call). The virtual surveillance team has clearly defined processes and clinical pathways to be followed for both AAM and eHospital. Most of the members meet regularly during staff meetings conducted by the strategic leader every alternate Tuesday, during which regional and virtual team updates, workplace safety, and schedules are discussed and reviewed.

The documentation of the Clinical Microsystem Assessment tool, developed by the IHI (2003), defines interdependence as, "the interaction of staff which is characterized by trust, collaboration, willingness to help each other, respect, and recognition that contribute individually to a shared purpose." In a virtual team the interdependence is highly reduced due to lack of interpersonal contact. A strength/weakness/opportunity/threat (SWOT) analysis of the microsystem was performed (See Appendix D).

SWOT Analysis

Strength. The team is comprised of QNCs with a Master's degree or those who are in the process of completing their Master's program. All the team members have a minimum of three years of experience either in clinical leadership roles, or quality operations in acute care settings.

Weakness. Most of the members in the virtual surveillance team work remotely from different physical locations, and with minimal face to face interactions.

Opportunity. Information from the IHI tool revealed an opportunity to enhance team interdependence.

Threat. The threat is a potential breakdown in communication due to inadequate resources such as technology interfaces available to the team.

Budget

The budget estimation is based on personnel expenses for committee/task force meeting expenses, training of staff on SharePoint, and non- personnel expenses for education materials, paper, and supplies for the team members. There are five task force members who met once a month from April 2018 through July 2018, and are scheduled to meet once a month from August to December 2018 and as needed in 2019. The average pay per hour for a team member is $80. The total annual personnel expense for 2018 is $30,960.

Approximately $3200/month for five months beginning August 2018 is allocated for task force team meetings essential for maintenance of the SharePoint. This is included in the 2018 total expense of $30,960. For the year 2019, the estimated cost of training four additional team members is $320. The estimated annual cost for non-personnel expenses is approximately $50 in 2018 and $10 in 2019. See Appendix F for the 2018- 2019 budget.

Financial Analysis

There are no recurring annual costs associated with the creation of the SharePoint communication platform, and development of an online learning module after July 2018, other than time spent by the committee members in team meetings starting August 2018 and for the maintenance of the communication platform in 2019. The project implementation is expected to contribute to an increase in communication between the virtual team members from a baseline of

58% to a target score of 75%, a reduction in the number of missed opportunities for information exchange among the team and the RRT RNs to five.

With the implementation of SharePoint communication platform an increase in staff productivity is expected, due to decrease in time spent at the start of the shift to 15 mins per team member. The cost avoidance accrued through increase in staff productivity is estimated to be $21,040. The estimated annual savings for year 2017 with AAM intervention associated with reductions in hospital and ICU length of stay, in the pilot site was $127,843. The annual cost of $30,960 for the clinical improvement project will generate cost savings of $14,160 per facility starting in 2018 for an estimated annual savings of $142,000 for the organization (See Appendix E).

Interventions

The literature review supported the view that team collaboration, communication, and technology skills are required for the success of virtual teams. The elements of the virtual team communication model consists of mission, members, links, AAM/eHospital documents, calendar, meetings, forms, web apps, and FAQs. The clinical improvement project focused on two interventions. One, to create a shared team communication platform or modify an existing workspace/ intranet specifically for the team. Two, to develop an online training module. The SharePoint task force team members actively participated via in person and WebEx meetings, and contributed to the development and designing of the virtual surveillance team site, one of the primary interventions for this project.

Study of the Interventions

Online surveys were provided to all members of the AAM/ eHospital virtual surveillance team. Baseline data measured interdependence, team awareness, interaction satisfaction,

teamwork dynamics, and technology access and use on a five-point scale. After baseline data was collected and quality gaps identified, small tests of change were conducted, including a new process for shift hand off reports, design of SharePoint site, online training module (with pre and post tests). An intermediate survey was conducted to evaluate interdependence and integration of information and information technology. Interventions will be re-evaluated after implementation through a final survey to maintain or modify any changes based on the results. The interdependence responses will be collected through post surveys with a set score target of 75% and above. Standardization of a new process for shift handoff reports was established and set at a target score of 100%. The design or modification of a shared workspace is being completed on SharePoint.

One small test of change included creation of an AAM handoff folder in Share Drive, where each team member saved their shift handoff report at the end of their shift. This test of change standardized the process of AAM handoff reporting for all three shifts, eliminating the risk of exposing Protected Health Information and excluding multiple email reports at the end of the shift. The test of change was adopted by the team. The small tests of change established the need for improving the elements of the communication model on the virtual surveillance team's SharePoint site page to support better communication and collaboration among the team members.

Measures

In order to achieve the outcome measures of improving the percentage of interdependence responses and percentage for technology support/ integration, process measures are creation of a SharePoint communication platform, standardization of shift hand off reporting, and an online training module for the platform. The balancing measure is the number of missed

opportunities of information exchange among the team and the RRT RNs. The percentage of interdependence responses and the percentage of integration of technology used to support the work of the virtual team were included in the intermediate survey and will be part of post implementation (See Appendix C).

Ethical Considerations

Demiris (2006) asserted that **"**The concept of virtual health care communities is relatively new and there are no specific guidelines or regulations addressing some of these ethical considerations" (p. 183). In the same article, Demiris noted that the American Medical Informatics Association provides guidelines for the electronic communication between patients and health care providers, specifying a turnaround time for messages, privacy issues, and documentation. Similarly, the American Telemedicine Association has developed a set of guidelines pertaining to patient, technology, and provider criteria for deployment of applications such as videoconferencing.

Demiris (2006) stated "Identity is an essential component of members of virtual communities" (p. 183), and added that confirming identity is a challenge because many of the basic cues of social role and personality are absent. Even though there are some identity cues such as IP address, domain name, tone of voice, and language, they are not reliable indicators of true identity. Trolling and impersonation are common in online communities, damaging trust and disseminating inaccurate information.

The other ethical challenges are privacy and confidentiality. Information privacy is the patient's right to control the use and dissemination of their information; confidentiality protects patients' privacy. The Health Insurance Portability and Accountability Act (HIPAA) passed in 1996, proposed standards pertaining to the security of all electronic health information, which

have had great impact on the design and operation of e-health applications. Ownership of and access to applications that are web-based have been addressed but, how to safeguard a consumer's consent to view their private information in a virtual environment remains problematic. Demiris (2006) addressed e-consent for privacy concerns associated with virtual communities and the need for its integration into systems design. Demiris also stressed that a code of ethics needs to be developed to protect patient records. Additional ethical issues particular to the virtual environment that persist today include falsification of accreditation, licensing.

The project was reviewed by faculty and is determined to qualify as an Evidence-based Change in Practice Project, rather than a Research Project. Institutional review board (IRB) review is not required (See Appendix A).

Results

The goal of the clinical improvement project is to improve team communication. One small test of change was a new process for saving the shift hand off reports in the Share Drive instead of shift emails to the team members. The intervention was successful and review of the handoffs in the Share Drive indicated 100% compliance. The other interventions in progress include designing of the SharePoint site and developing an education module. An intermediate survey of team interdependence and integration of information and technology to support the work of the team was conducted. The data results indicating the two success characteristics focused specifically on the descriptions that best described the CNL's clinical microsystem and the care it delivers. The results indicated that team interdependence, which is characterized by trust and collaboration, showed improvement from 58% to 72%. There was also an improvement in integration of information and technology from 47% to 60% (See Appendix G).

Once the SharePoint site design is completed, an online educational module will be developed, team members will be given training of one hour sessions each week over three weeks. Pre and post training tests will be conducted. A post implementation survey will follow to evaluate the percentage of interdependence and technology support and integration once the SharePoint site goes live and the team members utilize it. The intermediate survey showed team effectiveness increasing by 4% and technology ease of use by 5%. These percentages are expected to further increase once the SharePoint site is in use.

With the implementation of SharePoint communication platform an increase in staff productivity is expected, due to decrease in time spent at the start of the shift to 15 mins per team member. The cost avoidance accrued through increase in staff productivity is estimated to be $21,040. The long term cost savings attributable to this project through enhanced communication and with AAM implementation is an estimated 4.5 hour mean reduction in hospital length of stay and a 0.9 mean hour reduction in ICU length of stay. This would generate an annual cost savings of $14,160 per facility beginning in 2018 with an estimated annual savings of $142,000 for the healthcare organization.

Discussion

The new process for the shift hand off streamlined the location for saving the handoff, standardized the workflow for the team, and reduced the number of emails. But there were occasions where content in the handoff was missing, misplaced, erased in error or duplicated due to multiple team members accessing the folder during their shifts. During team meetings an agreement was made between the team members to access the hand off folder one person at a time during their shifts to prevent duplication, and communicate via skype message upon saving their handoff.

The intermediate survey showed improvement in team trust, collaboration and integration of information and technology. The next steps will be based on the feedback from the team members, post implementation and use of the site. Developing the SharePoint site provided insight to the SharePoint committee members that collaboration with other committees (i.e., Scheduling and AAM task forces) are needed to enhance the site features for the team. The process maps created for the AAM and eHospital workflows indicated an average of 19 steps and 32 keyboard clicks were performed by each team member to start their shift.

The strength of the project is the constant communication and collaboration by the SharePoint committee with the other committees, and leadership to enhance the features of the SharePoint site. In addition, the SharePoint team members are early adopters of technology, have varied experiences and skills to support and enhance the design of the SharePoint site and are motivated to contribute to a successful implementation.

Conclusions

The main purpose of the SharePoint site is to provide a one-stop-shop with all the essential information for the virtual team members, to streamline the workflow, and to create better channels for communication. The sustainability of the intervention depends on the continued maintenance of the site and constant updates of the documents available on the site. The implications for practice are pending based on feedback from team members after using the site. The suggested next step is to train additional team members to gain owner, administrator access to the SharePoint site to assist with ongoing site maintenance and be prepared for unexpected changes in committee membership. Through successful implementation of this evidence-based clinical improvement project, the CNL student can build the team and optimize performance, foster cost savings for the organization, and promote quality patient outcomes.

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Appendix A

CNL Project: Statement of Non-Research Determination Form

Student Name: Deepali Addagarla

Title of Project:

Virtual Team Management in the Regional Quality Department

Brief Description of Project:

Virtual teams are a common organizational structure in today's globalized business environment (MacLachlan, 2017). "A Virtual team also known as virtual workgroup is a group of people who participate in common projects by making collaborative efforts, and for the purpose of achieving shared goals and objectives" (McConnell, 2010). As rightfully stated by MacLachlan (2017) many attributes such as different physical locations, languages, diverse cultures and working styles can make virtual teams more complex. According to the article published in Harvard Business Review by Ferrazzi (2014) a 2009 study of 80 global software teams indicated that, "well-managed dispersed teams can actually outperform those that share office space." Similarly, it is also mentioned in an Aon Consulting report that using virtual teams can improve employee productivity with some organizational gains of up to 43% (Ferrazzi, 2014). But, it is definitely hard to get the virtual teams right. Hence the need for the organizations to have a virtual team management to build a successful, effective virtual team, foster team work and increase productivity.

A) Aim Statement: To improve integration of information between members of the virtual team and optimize team performance in the regional quality department by the end of July 2018.

B) Description of Intervention:

Provide Collaborative Technology Skills Training to virtual team members.

Facilitate effective communication through formal and informal channels.

C) How will this intervention change practice?

Improve virtual team management, optimizes team performance and enhance productivity.

D) Outcome measurements:

Outcome measures: Percentage of virtual team performance results.

Process measures: 1. Pre and post collaborative technology skill survey.
2. Number of communication platforms.

Balancing measures: 1. Number of errors reported due to miscommunication.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used:
(http://answers.hhs.gov/ohrp/categories/1569)

√☐ This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

☐This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title: Virtual Team Management in the Regional Quality Department	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	√	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	√	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making.	√	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	√	

The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	√	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	√	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	√	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	√	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	√	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print):

DEEPALI ADDAGARLA

Signature of Student:

Deepali Addagarla **DATE 2/4/2018**

SUPERVISING FACULTY MEMBER NAME (Please print):

NANCY TAQUINO

Signature of Supervising Faculty Member

_____DATE_____

Appendix B

Evaluation Table

PICOT Question **Deepali Addagarla**

In virtual teams (P) are there specific strategies (I) to improve team communication and collaboration (C) compared to in person teams to optimize team performance (O) by August 2018 (T)?

Study	Design	Sample	Outcome/Feasibility	Evidence rating
Umoren, R. A., Poore, J. A., Sweigart, L., Rybas, N., Gossett, E., Johnson, M., & ... Das, R. (2017). TeamSTEPPS Virtual Teams: Interactive Virtual Team Training and Practice for Health Professional Learners. *Creative Nursing.*	Observational Study -Virtual Simulation Platform- eight screen-based interactive virtual simulation scenarios (3 cover basic TeamSTEPPS communication tools- SBAR, Brief, CUS, Two-Challenge Rule, Check-Back and 5 feature safety issues related to English as a second language)	Data collected from Jan 1, 2016 to Dec 31, 2016 on senior prelicensure baccalaureate nursing and first- or-second year medical students at two Midwestern universities. Responses from 144 learners were collected anonymously.	Improves team performance and patient outcomes. Learners' recognition of TeamSTEPPS tools and strategies used. Learning promotes retention and practical application of skills. Assess learners' understanding of the components and application of each tool. Given the ease of access for virtual simulations, it is feasible to conduct additional studies of inter professional education (IPE) and teamwork training across various cultural and geographic settings, locally or internationally.	Level III, Good quality  TeamSTEPPS Virtual Teams.pdf

Workman, M. (2007). The effects from technology-mediated interaction and openness in virtual team performance measures. *Behaviour & Information Technology*.	Quasi-experimental technique Field study	436 virtual team projects over a 27-month period. Teams consisted of members from 17 countries, average team size was 8 members. 1197 individual responses. The total response rate on the self-report data collection was 78%, and the average team response rate was 76%.	Process-oriented teams that are more open have incrementally better performance on both measures: percentage schedule variance, and human –induced errors. Team openness would enhance performance by facilitating information exchange to fill in structure. Limitations regarding the certainty of the conclusions reached. Additional research is needed to confirm the findings. Some components more applicable to the organization rather than team level.	Level II, High quality  The effects from technology-mediated
Lepsinger, R., & DeRosa, D. (2011). Five ways to create successful virtual teams. *Baseline*	Study conducted by OnPoint Consulting	48 virtual teams	To help organizations maximize their investment in virtual collaboration. To understand the success factors of top-performing virtual teams. Feasible with better planning.	Level III, Good quality  Five Ways to Create Successful Virtual Tea
Wright, S. (2015). Examining the Impact of Collaborative Technology Skills Training on Virtual Team Collaboration	Online survey based on extensive literature review	100 participants who responded to the survey invitation, 75 met the requirements and went on to	The body of knowledge on virtual team effectiveness and the role of Collaborative Technology Skills Trainings (CTST's) on virtual teams.	Level III, High quality

Effectiveness. *Journal Of Applied Learning Technology*		complete the entire questionnaire. Of the 75 participants, 48 were male (64%), 20 were female (27%) and 7 did not indicate their gender (9%). 52 had CTST training (69%) and 23 did not have training (31%). Members of the Federal civilian and military workforce who worked in part as members of virtual teams.	Successful virtual teamwork is dependent on the CTST received by virtual team members. Higher levels of knowledge sharing, trust, performance, and satisfaction were increased as a result of having received training on the collaborative technologies used to interact online and thereby improved teamwork accomplishments. Advanced levels of communication were made possible by the knowledge, skills and abilities of team members who had been educated on how to maneuver within the virtual environment and excel in the use of the tools and techniques of collaborative technologies. CTST supports excellence in virtual team success and signifies importance of training programs to leverage team productivity. Feasible	 Examining the Impact of CTST.pdf
Majchrzak, A., MaIhotra, A., Stamps, J., & Lipnack, J. (2004). Can Absence	Benchmarking study of	54 successful teams in 26 companies	Far-flung teams can be remarkably productive, even outperforming	Level V, High quality

Make a Team Grow Stronger? *Harvard Business Review*	successful virtual teams 25 minute web based survey	representing wide variety of industries. 293 participants Some virtual teams were global and others regional Half had members from more than one company, half were long-term, and half had been set up just for a single project.	groups whose members work side by side. Far-flung teams not only have a wider variety of communication channels at their command but also free of many of the psychological and practical obstacles to full and effective participation. Far-flung teams establish a sense of connectedness and immediacy. Three principles that guided the team's productivity- team composition, use of technology to coordinate their efforts, and how the team leaders induced a collection of strangers with little in common to function as a mutually supportive group. Feasible when small groups adapt the kind of practices demonstrated.	 Can Absence Make a Team Grow Stronger.p

Roy, S. (2012). Virtual Collaboration: The Skills Needed to Collaborate in a Virtual Environment. *Journal Of Internet Social Networking & Virtual Communities*	Scholarly literature	None	Individuals need to have the following skills to engage in successful collaboration in virtual environments: Relationship building skills which include the ability to trust, familiarity, a positive environment/context, and embracing diversity. Communication skills which include the use of simple language, ambiguity and knowledge sharing, collaboration skills which include autonomy/delegation, motivation, adaptability, and innovation. Technological skills which include the use of web collaboration technologies, and virtual worlds/avatars. Despite the many advantages of the use of VCTs, there is still , much opposition to their use, because of the multiple barriers uniquely faced by Virtual Collaboration Teams (VCTs), and because many people still prefer face to- face collaboration to the use of VCTs.	Level V, High quality  Virtual Collaboration The Skills Needed.pdf

Appendix C

Project Charter

Project Charter: Virtual Team Management in the Regional Quality Department

Global Aim: To improve integration of information through communication strategies, collaborative technology skills training and incorporating best practices within the members of a virtual surveillance team to optimize team performance and enhance productivity.

Specific Aim: To improve integration of information between members of the virtual team and optimize team performance in the regional quality department by the end of July 2018.

Background:

Virtual teams are a common organizational structure in today's globalized business environment (MacLachlan, 2017). "A Virtual team **also** known as virtual workgroup is a group of people who participate in common projects by making collaborative efforts, and for the purpose of achieving shared goals and objectives" (McConnell, 2010). As rightfully stated by MacLachlan (2017) many attributes such as different physical locations, languages, diverse cultures and working styles can make virtual teams more complex. According to the article published in Harvard Business Review by Ferrazzi (2014) a 2009 study of 80 global software teams indicated that, "well-managed dispersed teams can actually outperform those that share office space." Similarly, it is also mentioned in an Aon Consulting report that using virtual teams can improve employee productivity with some organizational gains of up to 43% (Ferrazzi, 2014). But, it is definitely hard to get the virtual teams right. Hence the need for the organizations to have a virtual team management to build a successful, effective virtual team, foster team work and increase productivity.

Sponsors

Executive Director, Quality & Regulatory Services NCAL	Anne M Goldfisher
Leader Strategic Implementation Regional Clinical Effectiveness	Laure E Lisk

Goals

To improve team communication skills and provide collaborative technology skills training to virtual team members in the regional quality department to optimize team performance and enhance productivity by the end of July 2018.

1. Improve communication strategies.
2. Improve collaborative technology skills.
3. Establish a workspace for the virtual surveillance team.
4. Decrease errors due to miscommunication.

Measures

Measure	Data Source	Target
Outcome		
Improve the percentage of baseline interdependence responses	Pre and Post surveys	75%
Improve the percentage for technology support/ integration	Pre and Post Surveys	60%
Process		
Standardize new process for shift handoff report	Share drive	100%
Design or modify a shared workspace/intranet	SharePoint	Complete
Percentage of team knowledge	Online pre and post training module test scores	75%
Balancing		
Number of missed opportunities of information exchange among the team and the RRT RNs	Review the number of cases not reported- Statit report	5

Team

Lead Clinical Practice Consultant	Michael Tijerina
Quality Nurse Consultant Co-Lead	Deepali Addagarla
Quality Nurse Consultant Co-Lead	Rey Sulit
Quality Nurse Consultants Team Members	Sandy Madariaga, Stephanie Townsey

Measurement Strategy

Background (Global Aim): To improve integration of information through communication strategies, collaborative technology skills training and incorporating best practices within the members of a virtual surveillance team to optimize team performance and enhance productivity.

Population Criteria: Virtual team members of the Advance Alert Monitor (AAM)/ eHospital virtual surveillance team in the regional quality department Virtual Surveillance team.

Data Collection Method: Data will be obtained from online survey of clinical micro assessment tool, and survey tool for various elements of team awareness, interaction satisfaction and teamwork dynamic scale questionnaire measured on a 5-point scale which is provided to the

virtual team members of the AAM/ eHospital virtual surveillance team in the regional quality department. After baseline data is collected and care gaps identified, conduct small tests of change like standardization of new process for shift handoff reports, SharePoint technology task force and design/modify shared workspace/intranet. Re-evaluate data post implementation using the same online survey tools and modify or maintain the changes based on results.

Data Definitions

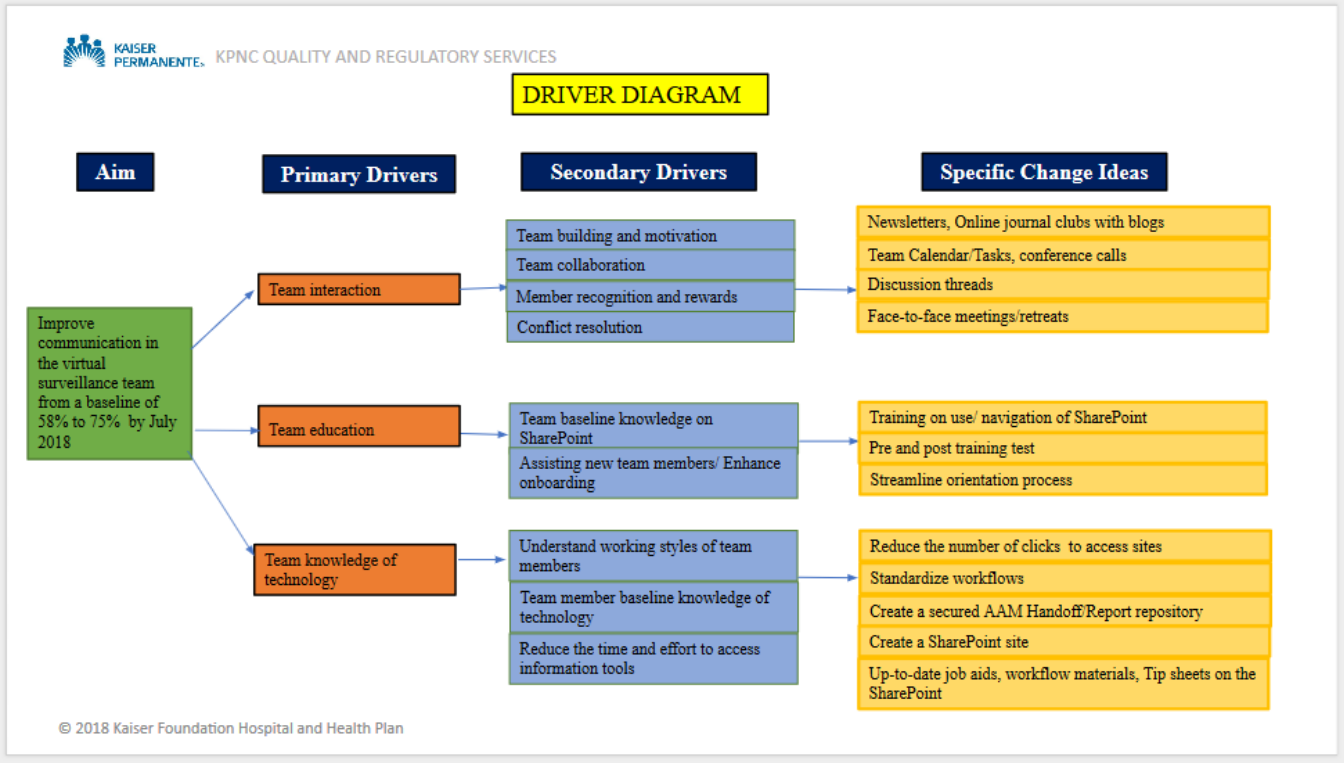
Data Element	Definition
Percentage of baseline interdependence responses	Post surveys score of 75% and above
Standardize new process for shift handoff report	Shift hand off reports 100% of the time
Design or modify a shared workspace/intranet	Complete on SharePoint
Number of missed opportunities of information exchange among the team and the RRT RNs	Statit report of 5 or less

Measure Description

Measure	Measure Definition	Data Collection source	Goal
Improve the percentage of baseline interdependence responses	N=# Number of members who responded to the highest point scale option D=# Total number of member responses	Pre and post surveys	75%

Training on team's shared workspace /website/ intranet	N= # Number of team members who completed the online training module test
	D=# Total number of members in the virtual surveillance team
		Pre and post online training module test	90%

Number of missed opportunities of information exchange among the team and the RRT RNs	N= # Number of missed opportunities
	D=# Total number of calls made to the RRT RNs
		Statit report	5


KAISER PERMANENTE
KPNC QUALITY AND REGULATORY SERVICES
DRIVER DIAGRAM
Aim
Primary Drivers
Secondary Drivers
Specific Change Ideas
Improve communication in the virtual surveillance team from a baseline of 58% to 75% by July 2018
Team interaction
Team education
Team knowledge of technology
Team building and motivation
Team collaboration
Member recognition and rewards
Conflict resolution
Team baseline knowledge on SharePoint
Assisting new team members/ Enhance onboarding
Understand working styles of team members
Team member baseline knowledge of technology
Reduce the time and effort to access information tools
Newsletters, Online journal clubs with blogs
Team Calendar/Tasks, conference calls
Discussion threads
Face-to-face meetings/retreats
Training on use/ navigation of SharePoint
Pre and post training test
Streamline orientation process
Reduce the number of clicks to access sites
Standardize workflows
Create a secured AAM Handoff/Report repository
Create a SharePoint site
Up-to-date job aids, workflow materials, Tip sheets on the SharePoint
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Timeline

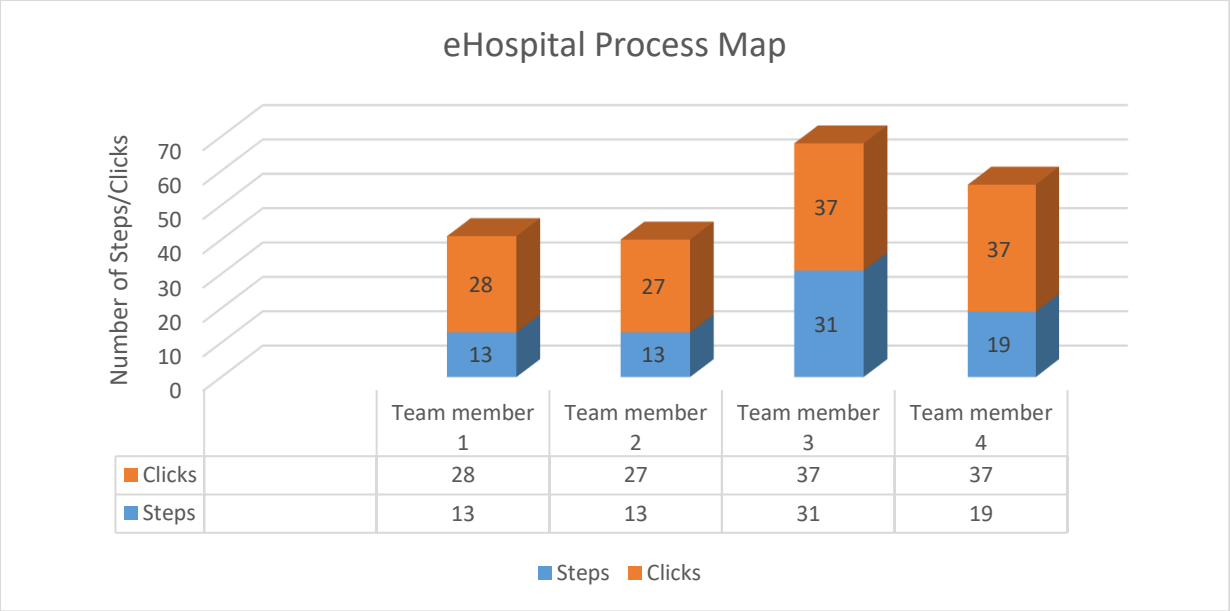
	March 2018	April 2018	May 2018	June 2018	July 2018	August 2018
Conduct Surveys						
Data Analysis						
Committee/ Task force meetings						
Standardize new process for shift hand off report						
Design shared workspace/ SharePoint, Develop online learning module						
Staff training on online module with pre and post test						
Implementation/ use of workspace/ SharePoint						
Feedback and process improvement						

Appendix D

PI Tools

SWOT Analysis

eHospital Process Map



Note: Average number of Steps = 19
Average number of Clicks = 32.25

Mind Map


Names and Address
Phone Numbers
Discussion Forums
Newsletters
Blogs
Team members
Web Apps
Clinical Library
My HR link
MIDAS
Hyperspace
KP Learn
Skype
Reimbursement
Links
Meetings
Staff meetings
Meeting notes
Meeting invite link
PTO requests
Shift Assignment
Schedules
Team Site Home Page
FAQ
AAM Workflow Tip sheet
eHospital Tip sheet
AAM/ eHospital Updates
Contact Numbers for AAM/ eHospital
Documents
Forms
Shift switch form
Supply request form
Vacation request form
Calendar
Birthday Calendar
Team retreat dates

Appendix E

Cost Avoidance accrued through increase in staff productivity due to SharePoint Site Intervention

Fiscal Year	Monthly Cost on Committee meetings and Staff Training (Apr-July 2018)	Estimated decrease in time/shift/ team member due to SharePoint site intervention	Estimated decrease in time/day for 15 members	Estimated cost avoidance/ day accrued by staff productivity	Estimated cost avoidance/ month accrued by staff productivity (Apr-July 2018)	Total Cost Avoidance (Apr-July 2018)
2018	**$14,960**	15 mins	225 mins= 3hrs 45 mins/day	$300	**$36,000**	**$21,040**

Note: Committee meetings = Once a month for 8 hrs. x 5 committee members= $3200/ month
One time staff training cost (27 team members) = 1 hr. /member = $2160
Average pay rate/hr. for one team member = $80
Total team members on shift /day= 15 (Day shift = 4, Evening shift = 7, Night shift = 4)
Total Cost Avoidance = $36,000 - $14,960= $21,040

Cost Benefit Analysis

Fiscal Year	Reduction in hospital LOS in WCR	Reduction in ICU LOS in WCR	Annual Savings	Additional Savings each year/ per facility
2017	$52,895	$74,948.4	$127,843.4	
2018	*$59,600	*$82,404	*$142,004	*$14,160.6

Note: 2016 Hospital charge description master for KFH (OSHPD, 2018).
Direct admission patient hospital observation care (estimate cost per hour) =$1490.00
Critical care ill/ injured patient initial 30-74 min = $3924.00
Ventilation assist and management in patient 1st day = $2050.00

Pilot site at Walnut Creek (WCR) results from Aug 2016 – Feb 2017 with AAM intervention
Mean 35.5 hour reduction in hospital LOS = $1490 x 35.5= $52,895
Mean 19.1 hour reduction in ICU LOS = $3924 x 19.1= $74,948.4

*Estimate of 40 hour reduction in hospital LOS with AAM implementation, and enhanced communication in 2018.
*Estimate of 21 hour reduction in ICU LOS with AAM implementation, and enhanced communication in 2018.

Currently AAM is implemented in 13 KFH.

Appendix F

Budget

Item	2018		2019	
	Annual Cost	Monthly Cost (Apr-Dec 2018)	Annual Cost	Monthly Cost
Personnel expenses				
Task force/ Committee meeting expenses	$28,800	$3200	$38,400	$3200
Training of staff on shared workspace/ SharePoint (one time cost)	$2160	$2160	$320/4*	$80/1*
Total Personnel Expenses	**$30,960**	**$5,360**	**$38,720**	**$3,280**
Non- Personnel Expenses				
Design or modify a shared workspace/ SharePoint	$0	$0	$0	$0
Education Materials/ paper/ supplies	$50	$50	$10	$10
Total Non-Personnel Expenses	**$50**	**$50**	**$10**	**$10**

Note: Average pay rate/hr. for one team member = $80
Average number of committee meetings/month = Once/8 hrs. Apr- Dec 2018, once/8 hrs. in 2019.
Approximate number of committee/task force members = Five
Average cost for education materials/paper/supplies = $50 in 2018, $10 in 2019.
Approximate time for one time staff training = One hour/27 QNCs in 2018, One hour/4 QNCs in the year 2019.
*Approximate additional staff in 2019 = 4/year.

Appendix G

Data Results

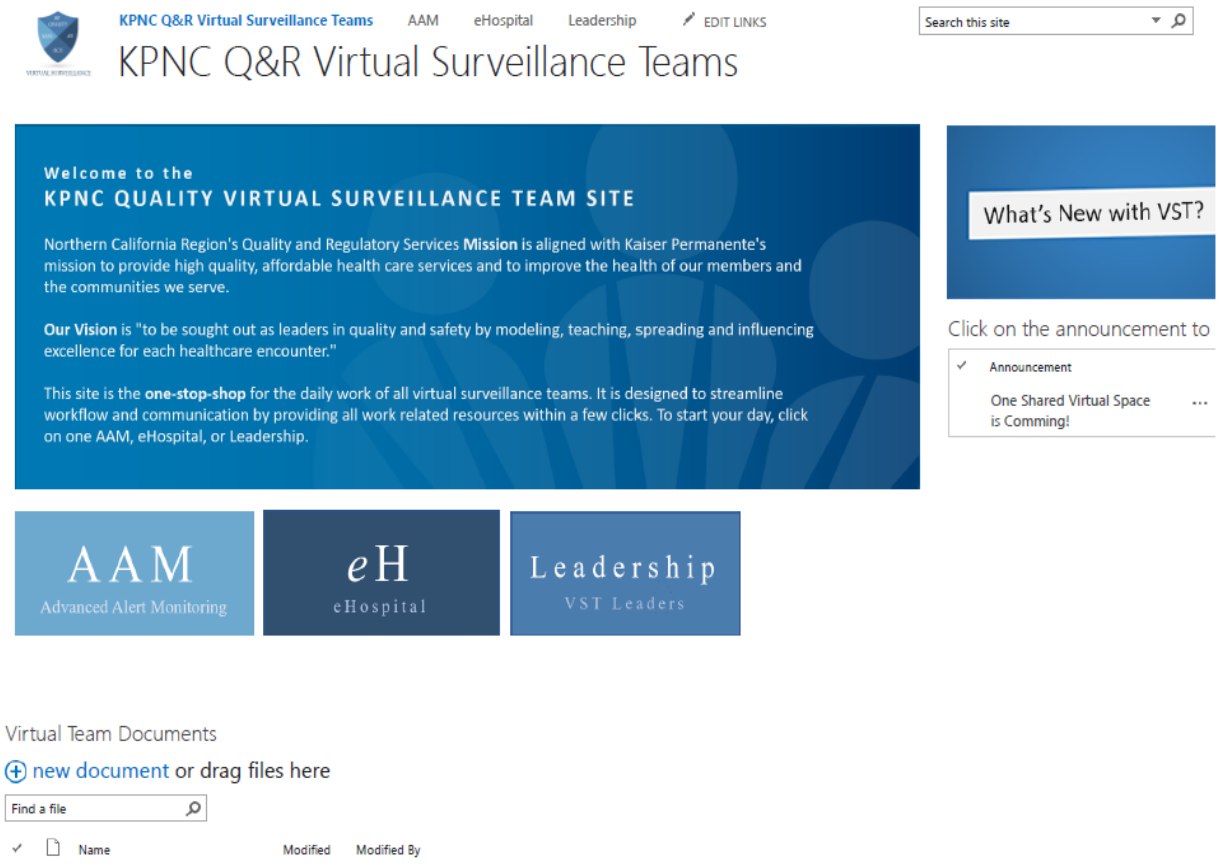
Q1. **Interdependence**: The interaction of staff is characterized by trust, collaboration, willingness to help each other, appreciation of complementary roles, respect and recognition that all contribute individually to a shared purpose.

Success Characteristics		Descriptions	Pre-Survey Responses 19	Intermediate Survey Responses 25
Staff Interdependence	1.	I work independently and I am responsible for my own part of the work. There is a lack of collaboration and a lack of appreciation for the importance of complementary roles.	5%	0%
	2.	The care approach is Interdisciplinary, but we are not always able to work together as an effective team.	32%	28%
	3.	Care is provided by a interdisciplinary team characterized by trust, collaboration, appreciation of complementary roles, and a recognition that all contribute individually to a shared purpose.	58%	72%
	4.	Can't Rate	5%	0%

Q2. **Information and Information Technology:** Information is THE connector - staff to patients, staff to staff, needs with actions to meet needs. Technology facilitates effective communication and multiple formal and informal channels are used to keep everyone informed all the time, listen to everyone's ideas, and ensure that everyone is connected on important topics. **B.** Integration of Information with Technology

Success Characteristics		Descriptions	Pre-Survey Responses 19	Intermediate Survey Responses 25
Information and Information Technology	1.	The technology I need to facilitate and enhance my work is either not available to me or it is available but not effective. The technology we currently have does not make my job easier.	16%	8%
	2.	I have access to technology that will enhance my work, but it is not easy to use and seems to be cumbersome and time consuming.	37%	32%
	3.	Technology facilitates a smooth linkage between information and patient care by providing timely, effective access to a rich information environment. The information environment has been designed to support the work of the clinical unit.	47%	60%
	4.	Can't Rate	0%	0%

Virtual Surveillance Team SharePoint site



PDSA Cycle


Standardize new process for AAM shift handoff report/ create folder in Share drive
AAM shift handoff reports for all three shifts were saved in Share drive =100% complete
Starting April 2018 each team member saves AAM shift handoff reports in Share drive for one week
Team members adopted the process of saving shift hand off reports in the folder in Share drive